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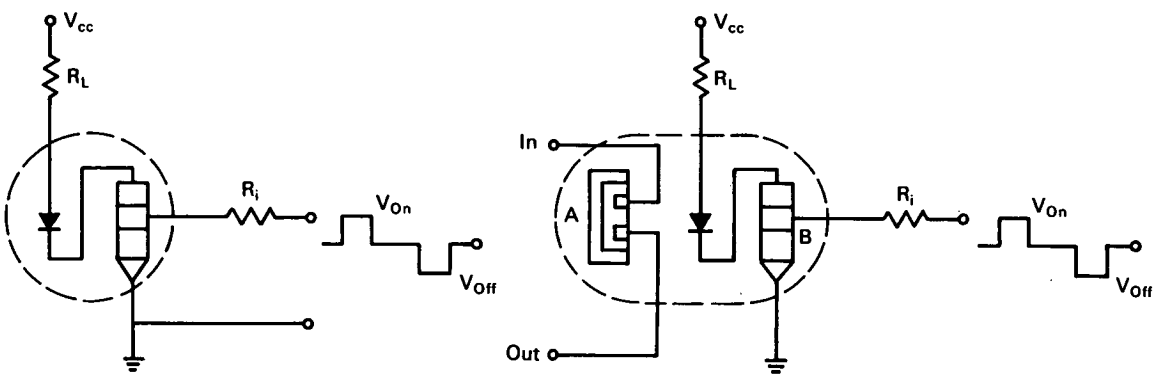
NASA TECH BRIEF

Electrically Controlled Optical Latch and Switch Requires Less Current



LATCH CIRCUIT

SWITCH CIRCUIT

The problem:

To design an improved electrically controlled optical latch and its related activation of an optically activated switch. In prior art, the activation of an optically activated switch was troublesome because the light source required large currents on the order of 100 ma.

The solution:

An electrically controlled optical latch composed of a sensitive phototransistor and a solid-state light source such as a GaAs light diode.

How it's done:

A small amount of base current begins to turn the transistor on from the normal off-state. The current which flows in the transistor also flows through the light source. The emitted light illuminates the transistor turning it on harder until it is driven into a latched position. It is to be noted that the light source-transistor combination must have a current gain greater than unity. To turn the device off from the latched position, a negative current must be applied to the base of the phototransistor.

The activation of an optically activated switch is troublesome because the light source requires large currents on the order of 100 ma. The switch circuit shown can be controlled and activated from a low power logic source. The light diode and phototransistor B constitute an electrically controlled light latch. The same light diode, which is equally efficient in two directions, and phototransistor A constitute the optically activated switch. Transistors A and B may be identical devices but connected in different modes.

Notes:

1. The optical latch circuit can be constructed of NPN or PNP transistors.
2. The optical latch circuit can be used as a current limiter by the insertion of an appropriate feedback resistor in the emitter lead of the phototransistor.

(continued overleaf)

3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, California 91103
Reference: B66-10414

Patent status:

No patent action is contemplated by NASA.

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under contract to
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